

CLAIMS

1. An nucleic acid molecule comprising a nucleotide sequence corresponding to a centromeric or neocentromeric region of mammalian, avian, plant, or other higher eukaryote DNA, said nucleic acid molecule comprising a heterologous nucleic acid molecule inserted within said centromeric or neocentromeric region or immediately adjoining or proximal region and which heterologous nucleic acid molecule is expressible or otherwise imparts a phenotypically observable effect on a cell carrying the heterologous nucleic acid molecule or on an organism or plant comprising said cell.
2. The isolated nucleic acid molecule of Claim 1 wherein the nucleic acid molecule is DNA.
3. The isolated nucleic acid molecule of Claim 1 or 2 wherein the nucleic acid molecule is derived from a mammal.
4. The isolated nucleic acid molecule of Claim 3 wherein the mammal is a human.
5. The isolated nucleic acid molecule of Claim 1 or 2 wherein the nucleic acid molecule is derived from a plant.
6. The isolated nucleic acid molecule of Claim 1 or 2 wherein the nucleic acid molecule is derived from an avian species.
7. The isolated nucleic acid molecule of Claim 4 wherein the centromeric or neocentromeric region comprises a q and p arm domain, and a scaffold domain and comprises a gene selected from hCG41809, hCG40976, hCG1781464, hCG39839, hCG1781461, hCG40945 and hCG1818126.

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8. An artificial or engineered chromosome comprising an isolated nucleic acid molecule comprising a nucleotide sequence corresponding to a centromeric or neocentromeric region of mammalian, avian or plant or higher eukaryote DNA, said nucleic acid molecule comprising a heterologous nucleic acid molecule inserted within said centromeric or neocentromeric region or immediately adjoining or proximal region and which heterologous nucleic acid molecule is expressible or otherwise imparts a phenotypically observable effect on a cell carrying the heterologous nucleic acid molecule or on an organism or plant comprising said cell.

9. The isolated nucleic acid molecule of Claim 8 wherein the nucleic acid molecule is DNA.

10. The isolated nucleic acid molecule of Claim 8 or 9 wherein the nucleic acid molecule is derived from a mammal.

11. The isolated nucleic acid molecule of Claim 10 wherein the mammal is a human.

12. The isolated nucleic acid molecule of Claim 8 or 9 wherein the nucleic acid molecule is derived from a plant.

13. The isolated nucleic acid molecule of Claim 8 or 9 wherein the nucleic acid molecule is derived from an avian species.

14. The isolated nucleic acid molecule of Claim 11 wherein the centromeric or neocentromeric region comprises a q and p arm domain, and a scaffold domain and comprises a gene selected from hCG41809, hCG40976, hCG1781464, hCG39839, hCG1781461, hCG40945 and hCG1818126.

15. A method for modifying a phenotype in a eukaryotic cell, said method comprising inserting a genetic sequence, capable of modifying the genome or proteome of the cell, when expressed in said cell into a centromeric or neocentromeric region or its immediately

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adjoining or proximal region of a chromosome or artificial or engineered chromosome and, in the case of an artificial or engineered chromosome, introducing the artificial or engineered chromosome into a cell.

16. The method of Claim 15 wherein the centromeric or neocentromeric region comprises a q and p arm domain, and a scaffold domain and comprises a gene selected from hCG41809, hCG40976, hCG1781464, hCG39839, hCG1781461, hCG40945 and hCG1818126.

17. A genetically modified non-human animal or plant comprising an artificial or engineered chromosome of Claim 8 or 14.

18. A genetically modified non-human animal comprising a modified phenotype of Claim 15 or 16.

19. A method of gene therapy in an animal said method comprising inserting a genetic sequence, capable of modifying the genome or proteome of the cell, when expressed in said cell into a centromeric or neocentromeric region or its immediately adjoining or proximal region of a chromosome or artificial or engineered chromosome and, in the case of an artificial or engineered chromosome, introducing the artificial or engineered chromosome into a cell.

20. The method of Claim 19 wherein the animal is a mammal.

21. The method of Claim 20 wherein the mammal is a human.

22. The method of Claim 21 wherein the centromeric or neocentromeric region comprises a q and p arm domain, and a scaffold domain and comprises a gene selected from hCG41809, hCG40976, hCG1781464, hCG39839, hCG1781461, hCG40945 and hCG1818126.